

Angle Resolved Photoemission study of CeMIn5 (M = Co, Rh)

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CeMIn5 (M=Ir, Co, Rh) is a relatively new structural family of heavy fermion (HF) compounds that exhibit superconductivity (SC) at ambient pressure, a coexistence of SC and anti-ferromagnetism, and also quantum critical behavior at the crossover from magnetic order to superconductivity. I will report our angle-resolved photoemission spectroscopy (ARPES) data for the paramagnetic phases, measured at ALS Beamline 7.0. The data give much more detailed information than in previous ARPES studies for the electronic structures and Fermi surface (FS) topologies of the HF superconductor CeCoIn5, the antiferromagnet CeRhIn5 and the alloy Ce(Co_{0.8}Rh_{0.2})In5, for which quantum critical crossover occurs. Analysis of multi-Brillouin zone ARPES electronic structure maps allows detailed comparison of the FS topologies and band dispersions between compounds with different compositions and also with the FS structures observed in de Haas van Alphen experiments. Comparison with theoretical predictions gives a more stringent test of the LDA band calculations than previously. Multiple sheets of large-orbit quasi-2D pieces of FS are observed to be in agreement with LDA predictions, but small-size contours near the zone center are more discrepant.